



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

July 31, 2016

Jack Oman
Project Manager
Atlantic Richfield Company
4 Centerpointe Drive
La Palma, CA 90623-1066

Re: Anaconda Copper Mine Site OU1
Approval of Geochemical Characterization DSR with Conditions

Dear Jack,

The U.S. Environmental Protection Agency (EPA) has completed its review of the following document: *Groundwater Geochemical Characterization DSR (Revision 1), December 11, 2015*. Based on our review we have concluded the document provides a good basis for understanding the differences in chemical processes controlling contaminant chemistry and fate in groundwater proximate to various sources areas on-site and within the off-site aquifer. Therefore EPA approves the document subject to the condition that the following modifications be made. An additional revision need not be made available for review but the document upon its modification will become an appendix to the Remedial Investigation Report which is currently under development.

EPA would like to note that the evaluation of predominant aqueous chemistry within this report provides the basis for developing models for assessing the potential extent of attenuation that may occur off-site, which is anticipated as a technical evaluation that may be a component for the Feasibility Study and/or Remedial Design. Since this document is distinct from the draft evaluation of background groundwater characteristics for the study area, it is recommended that interpretive statements referencing COI concentrations and spatial extent relative to "background" be removed or revised to reflect final revisions to the groundwater background report. Following is a list of specific comments to be incorporated into the final document.

Specific Comments:

- Section 3.2, Page 11, 2nd paragraph: It is recommended that statements concerning constituent concentrations that are "not elevated above background concentrations" be revised. These statements appear to be referenced to a draft document that has not yet been finalized ("Background Groundwater Quality Assessment – Revision 2", July 2, 2015).
- Section 3.2, Page 12, last paragraph: In order to clarify description of various regions of elevated arsenic discussed in this paragraph, please provide a list of wells that are being referenced relative to the "deep basinal faults (e.g., Sales Fault)". The list could be

included in this paragraph or it may be more efficient to include a table at the beginning of this section with well assignments to the various areas and/or hydrogeologic features that are mentioned throughout this section and the rest of the document.

- Section 5.5, Page 20, 1st paragraph: The plots of spatial distributions for uranyl-sulfate and calcium-uranyl-carbonate species do not appear in Appendix E, as referenced. It is presumed these plots refer to distributions of aqueous species in groundwater. Please include these in an updated version of Appendix E to this document.
- Section 6.0, Page 23, 2nd bullet: Please revise the first sentence to clarify that sulfate and uranium have been used as one line of evidence to assess the extent of mine-impacted groundwater, due to their high mobility under the predominant groundwater chemistry for the aquifer. The data derived from monitoring locations within the mine-site boundary indicate that there are a number of constituents, in addition to sulfate and uranium, which are associated with various contaminant source areas. These constituents generally display lower mobility than sulfate and uranium, which does not exclude their use as potential indicators of mine-impacted groundwater. The spatial heterogeneity of source area constituent concentrations demonstrate that there is not a uniform source chemistry. The chemical distributions observed for well screens at locations MW-5, MW-4 and B/W-34 illustrate the wide variability in the concentrations of mine-related COIs over relatively short spatial distances. For example, analysis of on-site well chemistry indicates that there is not a single contaminant source water type in which all COI concentrations are positively correlated.
- Section 6.0, Page 23, 2nd bullet: Please list wells that are associated with sources of elevated concentrations of arsenic for the “northeastern portion of the Study Area” and “regional faults (e.g., Sales Fault)”. This detail is needed to more clearly define the wells associated with the two sources of elevated arsenic concentration. The list could be included in this paragraph or it may be more efficient to include a table at the beginning of Section 3.2 with well assignments to the various areas and/or hydrogeologic features that are mentioned throughout the document.
- Section 6.0, Page 23, 3rd bullet: Please list wells that are attributed to the “northern portion of the Study Area”. This detail is needed to facilitate evaluation of the consistency of the vertical distribution of constituent concentrations that are listed in this paragraph. The list could be included in this paragraph or it may be more efficient to include a table at the beginning of Section 3.2 with well assignments to the various areas and/or hydrogeologic features that are mentioned throughout the document.
- Section 6.0, Page 23, 4th bullet: Please include the location of the “chemical contour maps” referenced in this statement, in order to clarify if this is in reference to Appendix C of the current document or a different document.

- Section 6.0, Page 24, 1st bullet: Please list wells that are attributed to the area “immediately to the west of the Evaporation Ponds”. The list could be included in this paragraph or it may be more efficient to include a table at the beginning of Section 3.2 with well assignments to the various areas and/or hydrogeologic features that are mentioned throughout the document.

Please note that the RI Report will still need to summarize geochemical conditions in the main body of that document and EPA will want to review that text for consistency.

EPA looks forward to working together with ARC and technical stakeholders to complete the RI Report. Please contact me with any questions or comments.

Best Regards,



David A. Seter, P.E.
Remedial Project Manager
USEPA Region 9
Superfund Division (SFD-8-2)

Cc: Anaconda Copper Mine Site Technical Stakeholder Group